WHAT IS CLAIMED IS:

1.   An optical information recording medium, at least storing information that indicates a standard recording linear velocity Vr and/or a maximum recording linear velocity

5   Vh, said optical information recording medium comprising:

        a transparent substrate having a concentric circular guide groove or a spiral guide groove, said guide grove having land portions and groves portions; and

        at least a phase change type recording layer on said

10   transparent substrate,

        when reflectivity of said optical information recording medium is measured, while irradiating energy on said guide groove such that the energy melts the material of said phase change type recording layer and while rotating

15   said optical information recording medium and increasing a linear velocity of gradually, and when the linear velocity at which the reflectivity of said optical information recording medium decreases, in comparison to the state when the energy is not radiated, is defined as dislocation linear

20   velocity V, then the dislocation linear velocity V satisfies a relation

        $V \geq Vr \times 0.85$ or

        $V \geq Vh \times 0.85$.

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2.   The optical information recording medium according to claim 1, wherein the dislocation linear velocity V satisfies a relation

$Vr \times 0.9 \leq V \leq Vr \times 2.0$ or

$Vh \times 0.9 \leq V \leq Vh \times 2.0$.

3.   The optical information recording medium according to claim 1, wherein said optical information recording medium further stores information that indicates that said optical information recording medium satisfies the relation relating to the dislocation linear velocity V.

4.   The optical information recording medium according to claim 1, wherein at the time of crystallizing an entire surface of said phase change type recording layer, an initialization linear velocity Vi satisfies a relation

$Vr \times 0.5 \leq Vi \leq Vr \times 1.6$ or

$Vh \times 0.5 \leq Vi \leq Vh \times 1.6$

5.   The optical information recording medium according to claim 1, wherein a track pitch of said guide groove is between 0.2 and 1.4 μm, and the dislocation linear velocity V is between 6 and 24 m/s.

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6.   The optical information recording medium according to claim 1, wherein when no data is recorded, the phase change type recording layer has a cubic lattice crystal structure.

5   7.   The optical information recording medium according to claim 1, wherein said phase change type recording layer is made from a material that includes a material that satisfies the relation

$Sb_\chi Te_{100-\chi}$ (where χ is atomic percentage and $40 \leq \chi \leq$

10   80).

8.   The optical information recording medium according to claim 7, wherein said phase change type recording layer has at least one element selected from a group consisting of Ga, Ge, Ag, In, Bi, C, N, O, Si, and S, as an additive

15   element.

9.   The optical information recording medium according to claim 1, wherein said phase change type recording layer

20   is made of material that satisfies a relation

$(Ag, Ge)_\alpha (In, Ga, Bi)_\beta Sb_\gamma Te_\delta,$

where (Ag, Ge) means at least one element selected from Ag and Ge, (In, Ga, Bi) means at least one element selected from In, Ga, and Bi, α, β, γ, and δ represent atomic percentages

25   and satisfy the relation

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$0.1 \leq \alpha \leq 7,$

$1 \leq \beta \leq 15,$

$61 \leq \gamma \leq 85,$ and

$20 \leq \delta \leq 30.$

10. The optical information recording medium according to claim 1, wherein under recording conditions such that

when n represents an integer equal to or higher than 1, and T represents a clock time corresponding to a period of a clock used for modulating a signal, a recording beam at the time of recording or rewriting a 0 signal having a signal width n × T after modulation is a continuous beam having a power level e,

a pulse string of a recording beam at the time of recording or rewriting a 1 signal having a signal width n × T after modulation is a laser wave pulse string that has a pulse portion fp having a time width x and a power level a, a multi-pulse portion mp in which a low-level pulse of a power level b having a time width T in total and a high-level pulse having a power level c alternately appear and continue by (n − n') times in total at a duty ratio y, and a pulse portion ep having a time width z and a power level d, and

the time width x, duty ratio y, and the time width z satisfy relations T × 0.125 ≤ x ≤ T × 2.0, 0.125 ≤ y ≤ 0.875, and T × 0.125 ≤ z ≤ T, and the power levels a b, c,

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d, and e satisfy a relation a & c > e > b & d, then

a first protection layer, said phase change type recording layer, a second protection layer, a reflection layer, and a resin layer are formed on said transparent

5 substrate in such a manner that the thickness of each layer makes it possible to record at a higher speed than the standard recording linear velocity Vr or the maximum recording linear velocity Vh.

10 11. The optical information recording medium according to claim 1, wherein said optical information recording medium has a multilayer structure with at least a first protection layer, said phase change type recording layer, a second protection layer, a third protection layer, a reflection

15 layer, and a resin layer stacked in order on said transparent substrate.

12. The optical information recording medium according to claim 11, wherein a material constituting said third

20 protection layer is formed by DC sputtering.

13. The optical information recording medium according to claim 11, wherein a material constituting said third protection layer includes at least one substance selected

25 from a group consisting of C, Si, SiC, CiN, SiO, and SiO_2.

14. The optical information recording medium according to claim 1, wherein a linear velocity when crystallizing an entire surface of said phase change type recording layer is slower than the dislocation linear velocity V.

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15. A method of recording/reproducing optical information, the method comprising the steps of:

setting a phase change type of optical information recording medium to an optical information recording/reproducing apparatus, said optical information recording medium recording in advance specific information indicating that a dislocation linear velocity corresponding to said optical information recording medium satisfies a specific relation;

reproducing the specific information from said optical information recording medium;

deciding from the specific information, whether it is possible or not to record at a recording linear velocity higher than a maximum recording linear velocity of the optical information recording medium; and

recording and reproducing at a recording linear velocity higher than the maximum recording linear velocity, when it is decided in the deciding step that it is possible to record at a higher recording linear velocity than the maximum recording linear velocity.

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16. An apparatus for recording/reproducing optical information, the apparatus comprising:

a specific information reproduction unit which reproduces a specific information from a phase change type of optical information recording medium, wherein said optical information recording medium recording in advance the specific information indicating that a dislocation linear velocity corresponding to said optical information recording medium satisfies a specific relation;

a deciding unit which decides from the specific information, whether it is possible or not to record at a recording linear velocity higher than a maximum recording linear velocity of the optical information recording medium; and

a data reproduction/recording unit which reproduces or records at a linear velocity higher than the maximum recording linear velocity, when said deciding unit decides that it is possible to record at a higher recording linear velocity than the maximum recording linear velocity.

17. A phase change type optical information recording medium comprising a recording layer made from a phase change recording material that changes between an amorphous state and a crystalline state based on irradiation of an electromagnetic beam, wherein

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the phase change recording material includes at least one element selected from Ag, In, Sb, and Te, and a bond coordination number of the selected element/s is different between an amorphous state after a film formation and a

5   crystalline state after an initialization and after an information erasing.

18. The optical information recording medium according to claim 17, wherein among the constituent elements of the

10   phase change recording material, a bond coordination number of Ag and In with respect to Te in the crystalline state is larger than a bond coordination number of Ag and In with respect to Te in the amorphous state.

15   19. The optical information recording medium according to claim 17, wherein among the constituent elements of the phase change recording material, a bond coordination number of Ag with respect to Te in the amorphous state is between 1.5 and 2.5, and a bond coordination number of Ag with respect

20   to Te in the crystalline state is between 3.5 and 4.5.

20. The optical information recording medium according to claim 17, wherein among the constituent elements of the phase change recording material, a bond coordination number

25   of In with respect to Te in the amorphous state is between

3.0 and 3.8, and a bond coordination number of In with respect
to Te in the crystalline state is between 3.4 and 4.2.

21.   The optical information recording medium according
to claim 17, wherein among the constituent elements of the
phase change recording material, a bond coordination number
of Sb with respect to Te in the crystalline state is smaller
than a bond coordination number of Sb with respect to Te
in the amorphous state.

22.   The optical information recording medium according
to claim 21, wherein among the constituent elements of the
phase change recording material, a bond coordination number
of Sb with respect to Te in the amorphous state is between
2.7 and 3.5, and a bond coordination number of Sb with respect
to Te in the crystalline state is between 2.0 and 2.8.

23.   The optical information recording medium according
to claim 17, wherein the phase change recording material
has an NaCl type structure in the crystalline state.

24.   The optical information recording medium according
to claim 23, wherein among the constituent elements of the
phase change recording material, Cl site in the NaCl type
structure occupied by Te has a large number of holes.

25.   The optical information recording medium according to claim 24, wherein among the constituent elements of the phase change recording material, Cl site the NaCl type structure to be occupied by Te has holes between 7/12 and

5   9/12.

26.   A method of manufacturing a phase change type optical information recording medium, said optical information recording medium comprising a recording layer made from a

10   phase change recording material that changes between an amorphous state and a crystalline state based on irradiation of an electromagnetic beam, wherein

the phase change recording material includes at least one element selected from a group consisting of Ag, In, Sb,

15   and Te, and a bond coordination number of the selected element/s is different between an amorphous state after a film formation and a crystalline state after an initialization and after an information erasing, and

wherein said recording layer is formed with an electric

20   power between 250 W and 850 W while raising a temperature of a substrate at a constant rate between 10 °C/min and 50 °C/min.

27.   An optical information recording medium comprising:

25   a disk-shaped substrate; and

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at least a phase change type recording layer stacked on said substrate, wherein said phase change type recording layer is made from material which includes Ge, Ga, Sb, and Te, and when α, β, γ, and δ represent atomic percentages of

5   Ge, Ga, Sb, and Te, and $\alpha + \beta + \gamma + \delta = 100$, then α, β, γ, and δ satisfy the relations

$$0.1 \leq \alpha \leq 7,$$

$$1 \leq \beta \leq 9,$$

$$61 \leq \gamma \leq 75,$$

10   $$22 \leq \delta \leq 30.$$

28.   The optical information recording medium according to claim 27, wherein said phase change type recording layer has been added with at least one element selected from a

15   group consisting of In, Zn, Sn, Si, Pb, Co, Cr, Cu, Ag, Au, Pd, Pt, S, Se, Ta, Nb, V, Bi, Zr, Ti, Al, Mn, Mo, Rh, C, N, and O.

29.   The optical information recording medium according

20   to claim 27, wherein a composition ratio of Ge and Ga is $-8 \leq \alpha - \beta \leq 3.$

30.   The optical information recording medium according to claim 27, wherein a composition ratio of Sb and Te is

25   $\gamma + \delta \geq 88.$

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31.   The optical information recording medium according
to claim 27, wherein

the optical information recording medium is applied
with an information recording/reproducing method for
5   recording, reproducing and rewriting information onto/from
the optical information recording medium, by generating a
phase change in a recording layer of the optical information
recording medium based on irradiation of a laser beam onto
the optical information recording medium, and

10   it is made possible to execute a multi-speed recording
and/or a CAV recording onto the optical information recording
medium, based on an arrangement that

in the case of recording information onto an
information recording medium by modulating a signal
15   according to a PWM recording system, a recording wave at
the time of recording or rewriting a 0 signal having a signal
width $n \times T$, where T is a clock time, after modulation is
a continuous beam having a power level e, and

a recording wave pulse string at the time of recording
20   or rewriting a 1 signal having a signal width nT after
modulation is an electromagnetic wave pulse string that has
a pulse portion fp having a time width x and a power level
a, a multi-pulse portion mp in which a low-level pulse of
a power level b having a time width T in total and a high-level
25   pulse having a power level c alternately continue by (n −

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n') times in total at a duty ratio y, and a pulse portion op having a time width z and a power level d, where the time width x, duty ratio y, and the time width z satisfy relations $T \times 0.5 \leq x \leq T \times 2.0$, $0.125 \leq y \leq 0.875$, and $T \times 0.125 \leq$

5    $z \leq T$, where n' is a positive integer equal to or greater than n, and the power levels a b, c, d, and e satisfy a relation $a \& c \geq e \geq b \& d$.

32.   The optical information recording medium according

10   to claim 31, wherein a duty ratio of the pulse portion mp increases or decreases according to a recording linear velocity.